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Stolthaven Australia Pty Ltd

22-June-2023

Air Quality Management Plan

Bulk Liquid Storage Terminal, Mayfield NSW

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Bulk Liquid Storage Terminal, Mayfield NSW

Client: Stolthaven Australia Pty Ltd

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G	22-June-2023	Throughput increase & general review/PoN input	Ryan Duckmanton Site Manager	

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Glossary of Terms

DEC	NSW Department of Environment and Conservation
DECCW	NSW Department of Environment, Climate Change and Water
EA	Environmental Assessment
EPA	Environment Protection Authority (formerly part of OEH)
EPL	Environment Protection Licence
OEH	NSW Office of Environment and Heritage (formerly DECCW)
ML	Mega litres
Stolthaven	Stolthaven Australia Pty Limited
NEPC	National Environment Protection Council
NEPMs	National Environment Protection Measures
POEO	Protection of the Environment Operations
VCS	Vapour Control System
VOC	Volatile Organic Compounds
VRU	Vapour Recovery Unit

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1.0 Introduction

Stolthaven Australia Pty Ltd (Stolthaven) has approval to operate a bulk fuel storage facility at Mayfield, NSW (the Facility). The site is located within the area covered by the Mayfield Concept Plan. The Facility has an approved (SSD_7065) annual throughput of 3,500 mega litres (ML) being a combination of petroleum, diesel and biodiesel. Product is delivered to the facility by ship and distributed by truck.

The main potential sources of air emissions associated with the operations of the development are vapour emissions from the storage and transfer of fuels (volatile organic compounds [VOCs]).

This Air Quality Management Plan (the Plan) was prepared on behalf of Stolthaven in response to their Mayfield bulk fuel storage facility's planning approval consent conditions.

Operations to which this OEMP Apply

The operations to which this OEMP applies are:

- The operation of approved established terminal & the new combustible fuels wharf line which connects the existing terminal to Mayfield Berth No. 7, as approved under SSD_7065. The operation of the wharf line also includes the following ancillary elements:
  - Fire and safety systems
  - Lighting and CCTV
  - Power and communications systems
  - Fencing.

Note: The operation of any other elements of the project approved under SSD_7065 (such as increased throughput or flammable storage) would be subject to additional updated to this OEMP, review and approval by the Department of Planning and Environment.

1.1 Plan Objectives

The objective of this Plan is to document the rationale and methods for the management of ambient air quality pollution potentially resulting from the site's operations, and to provide a framework for the adequate mitigation of potential pollutants to minimise their emissions. By following this framework, it is envisaged that Stolthaven will minimise the risk of contamination to the environment as a result of potential air pollution generated from operations at the site.

The Plan was prepared in accordance with the requirements set out in the site's consent conditions (application number SSD 7065) and Environment Protection Licence (EPL) (number 20193) as detailed in **Section 3.0**.

The Plan aims to:

- Outline the legislative framework and standards applicable to the operation;
- Identify the sensitive receptors in proximity to the site;
- Detail the potential operational activities that may contribute to off-site pollutant impacts, including the pollutants that are of interest;
- Outline mitigation measures required to minimise the operation's impacts on the local air quality;
- Outline the contingency plans for complaints and pollution incidents; and
- Detail the review and reporting protocols.

1.2 Infrastructure

Stolthaven currently has approval to operate a bulk fuels terminal to receive, store and dispatch diesel and biodiesel fuel. Fuel is delivered by ship and dispatched by truck. The approved Facility includes nine above-ground storage tanks (seven diesel and two biodiesel – combustible storage).

Also under SSD_7065 the facility has a total approved throughput of 3,500 MLpa of petroleum, diesel, ethanol and jet fuel utilising a total of 26 tanks. The Project includes the installation of a Vapour Control System (VCS) for the gantry emissions. As approved, the facility makes use of an existing ship berthing facility to receive diesel fuel, which is transferred to site using an above-ground, dedicated pipeline approximately 1 km in length. Delivery and dispatch would occur 24 hours per day, 7 days per week.

The dimensions of the existing and proposed structures are summarised in **Table 1**. Note that the fuel allocation is a reasonable estimate of the fuel stored, however this may change depending on supply and demand.

Table 1 Summary of Existing and Proposed Tanks

Tank ID No.	Structure	Tank Diameter (m)	Shell Height (m)	Usable Volume* (m^3)	Approval Status
1	Diesel	36.6	17.1	17,000	Approved
2	Diesel	36.6	17.1	17,000	Approved
3	Diesel	36.6	17.1	17,000	Approved
4	Biodiesel	7.6	12	460	Approved
5	Diesel	36.6	17.1	17,000	Approved
6	Diesel	36.6	17.1	17,000	Approved
7	Biodiesel	18	17	3970	Approved
8	Diesel	36	17.6	17,150	Approved
9	Diesel	36	17.6	17,200	Approved
10	ULP	30	17	10,060	Proposed
11	ULP	30	17	10,060	Proposed
12	ULP	30	17	10,060	Proposed
13	ULP	35	19	15,860	Proposed
14	ULP	35	19	15,860	Proposed
15	ULP	25	19	7,770	Proposed
16	ULP	25	19	7,770	Proposed
17	PULP	30	17	10,060	Proposed
18	ULP	30	17	10,060	Proposed
19	ULP	30	17	10,060	Proposed
20	Diesel	33	20	15,660	Proposed
21	Diesel	33	20	15,660	Proposed
22	Diesel	38	20	20,960	Proposed
23	Diesel	38	20	20,960	Proposed
24	Diesel	28	20	11,110	Proposed
25	Ethanol	15	13	1,860	Proposed
26	Jet Fuel	15	13	1,870	Proposed

*Note Usable Volume equals gross volume minus dead space

1.3 Site Description

The Facility is located on part of the former BHP Steelworks site, known as the Mayfield Concept Approval Site, as shown in **Figure 1** along with the sensitive receptor locations. The site is approximately 5 km northwest of the Newcastle Central Business District and is located within Lots 2 and 2 DP 1177466, Lots 39, 38, 37 and 36 DP1191723 and part of Lot 4 DP1184514 which is leased to Stolthaven from the Port of Newcastle (PON).

The topography in the area beside the Hunter River is essentially flat. The area surrounding the terminal is characterised by a mixture of port-related activities, industrial uses, and commercial areas. The nearest residential area is located at Mayfield, with the closest receptors approximately 900 m from the approved terminal site. Neighbouring industry includes OneSteel and Koppers Coal Tar Products to the west and Port Waratah Coal Services to the north. Land to the east and south of the site is currently vacant and proposed for future industrial development.

Figure 1 Site and Sensitive Receptor Locations

2.0 Sensitive Receptors

2.1 Definition

Sensitive receptors are identified as anywhere someone works or resides or may work or reside, including residential, hospitals, hotels, shopping centres, playgrounds, recreational centres, etc. Further definition is provided below.

2.1.1 Residential Areas

Residential areas are regarded as highly sensitive as inhabitants live within these areas on a continual 24-hour, year-round basis. Further, the maximum compliance health levels must be applied to this area to cater for the minimum expected health levels of a spectrum of inhabitant air pollutant tolerance levels. Vulnerable exposed persons include the old, the young, the infirm and persons with susceptibility to certain pollutants.

2.1.2 Industrial/Commercial Areas

Air pollutant exposure levels are averaged over an 8-hour time-weighted-average as per the standard working day for workers within industrial areas, making these areas inherently less sensitive than residential areas. By the very nature of industrially zoned areas, air quality standards are typically less stringent than those specified for ambient air. Further, the likelihood of complaints is considerably less than those for residential areas as most communities expect a slightly degraded quality of air. This attitude for air quality, however, is not one that should be adopted as the base level of acceptance, and operations should be carried out in a manner that does not contribute to levels exceeding ambient standards. The sensitivity of these types of sites should be assessed and determined on an individual site-specific basis that considers the full range of impacts and potential receptors.

2.1.3 Agricultural Areas

Human interaction with agricultural areas is intermittent and thus regarded as a low risk site in terms of exposure levels from exterior sources when compared to emissions produced intra-site. The most important receptor of pollution is the specific agricultural activities taking place within the area whether it be livestock or crop related. Crop damage may result from SO_2 levels that exceed certain levels. Bioaccumulation is a phenomenon that must also be considered as the impacts have the potential to be carried on to humans through ingestion of livestock products or harvested crops. The emission and deposition of airborne particulate matter, especially metals, within an agricultural area must therefore be limited in accordance to the sensitivity of the crop or beast in accumulating the metal over a certain exposure time.

2.1.4 Conservation Areas

Conservation areas are typically areas identified by governmental bodies as ecologically vulnerable due to their highly complex and finitely balanced ecosystems, making them highly physically and chemically susceptible to external sources of pollutions – particularly airborne particulate matter. The effects or identification of pollutant contributors is often identified aesthetically through complaints and observations submitted by government or locals. The effects of such contaminations usually are not detected until the threshold for reversing the environmental damage has passed which highlights the importance of minimising external airborne emission pollutions to areas of ecological significance.

2.2 Sensitive Receptor Locations

The area surrounding the facility is characterised by a mixture of port-related activities, industrial uses, and residential and commercial areas. The nearest residential area is located at Mayfield, with the closest receptors approximately 800 m from the terminal site. Other residential areas in proximity to the Facility include the suburbs of Carrington, Wickham and Tighes Hill. Neighbouring industry includes metals processing and coal tar production to the west and coal services to the north. Land to the east and south of the site is currently vacant and proposed for future industrial development. The sensitive receptors are presented in **Figure 1**.

3.0 Statutory Framework and Regulatory Guidelines

There are various pieces of legislation and associated regulations that govern air emissions in NSW. This section summarises the acts, regulations and guidelines relevant to the site.

3.1 Legislation

Applicable legislation relevant to the site's air quality impacts include, but may not be limited to:

- *Protection of the Environment Operations Act 1997* (POEO Act); and
- *Protection of the Environment Operations (Clean Air) Regulation 2022.*

The *Protection of the Environment Operations Act 1997* (POEO Act) is the key piece of environment protection legislation administered by the NSW Environment Protection Agency (EPA). Under the POEO Act, the POEO (Clean Air) Regulation 2022 is the core legislative and regulatory instrument for air quality issues in NSW. It comprises regulatory measures for a number of issues, including motor vehicles and motor vehicle fuels, and emissions from industry. The EPA licenses scheduled activities under the Regulation, while local councils' licence non-scheduled activities (with exceptions).

The POEO Act allocates responsibilities for pollution prevention and control to the EPA, local councils and other public authorities. The EPA is the appropriate regulatory authority for regulating activities listed in Schedule 1 of the POEO Act, ensuring compliance with environment protection licences and regulating activities carried out by the state or a public authority.

3.2 Guidelines

3.2.1 Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales

The NSW EPA document *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (DEC, 2017), hereon referred to as the Approved Methods, lists the statutory methods for modelling and assessing emissions of air pollutants from ambient environments. The Approved Methods outlines the requirements for developing air dispersion modelling methodology, analysing meteorological data, and the criteria applicable when considering the potential impacts as a result of operations at the site.

3.2.2 National Environment Protection Measures

National Environment Protection Measures (NEPMs) are broad framework-setting statutory instruments defined in the National Environment Protection Council (NEPC) Act 1994. They outline agreed national objectives for protecting or managing particular aspects of the environment. A NEPM will become law in each participating jurisdiction once it is made by NEPC. There are currently five NEPMs in place that relate either entirely or partly to air quality.

The NEPM for Ambient Air Quality (Air NEPM) was made in 1997 and specifies standards and goals for ambient levels of the "criteria" air pollutants. The criteria pollutants are ubiquitous in urbanised areas and are general indicators of air quality. In February 2015, the Air Quality NEPM was updated to include $PM_{2.5}$ particulates and add an annual averaging period criterion for PM_{10}. All other pollutants and criteria remained as per the previous document.

3.3 Mayfield Concept Plan

This Plan has been prepared having consideration of the Mayfield Concept Plan Air Quality Monitoring Program (AQMP). Specific monitoring requirements in respect of the Stolthaven facility would be reported to PON as required. Further detail regarding site specific monitoring is provided in **Section 6.3**.

3.3.1 Mayfield Site Air Model Protocol

The *User Guide, Mayfield Concept Plan Air Dispersion Site Model* (AECOM, 2015) (The User Guide provides the details regarding the process to be followed prior to, during and after undertaking air

quality assessments for Projects in the Mayfield Concept Plan Area. The User Guide provides for the modelling of projects in the manner outlined in the document which can be summarised as:

- Proponents contact PON and obtain the latest version of the Modelling files for the Site Model;
- Proponents engage suitably qualified persons to undertake air quality modelling of a specific projects. As the latest version of the site model will already contain details of all existing and approval operations in the Concept Plan Area this will allow for project, incremental and cumulative impacts to be assessed.
- Prior to the lodgement of any Project under the Concept Plan, for approval with DP&E, an environmental assessment, including the project specific air quality impact assessment and related modelling files, will be provided to PON for review. PON must subsequently provide landowners consent any projects in the Concept Plan area thereby approving the modelling outcomes.
- Upon Approval of a Project, the proponent would update the Site Model to incorporate the approval Project and return the modelling files to PON.
- PON would subsequently update its User Guide, Specifically Appendix A, to include details of the latest version and a summary of the latest assessment and Site Air Model Status.
- The Model and User Guide would then be available for the next proponent in the Concept Plan area who is required to undertake an Air Quality Impact Assessment.

Stolthaven followed the methodology for Air Quality Impact Assessments detailed in the User Guide when preparing the Stage 3 AQIA (AECOM, 2017). Stolthaven would follow the requirements of the User Guide as required for any future air quality assessments. Stolthaven would also undertake continual consultation with PON to identify specific communication requirements for the provision of information over the duration of the Project.

3.4 Consent Conditions

Table 2 presents a copy of the consent conditions provided to the Stolthaven liquid fuels storage facility application number SSD_7065.

SSD_7065 was approved on 15 December 2016. This approval has allowed for an increased in total annual site throughput of 3,500ML per year of petroleum, diesel, ethanol and jet fuel utilising a total of 26 tanks. It includes the installation and commission of a Vapour Recovery Unit (VRC). The updated consent conditions are also presented in **Table 2**.

Table 2 Consent Conditions – Application Number SSD 7065 dated 15 December 2016

SSD 7065

AIR QUALITY

Air Quality Limits

C11. The Applicant shall install and operate equipment to ensure the Site complies with all load limits, air quality criteria and air quality monitoring requirements as specified in an EPL for the Site.

Offensive Odour

C12. The Applicant shall not cause or permit the emission of offensive odours beyond the boundary of the Site, as defined under Section 129 of the POEO Act.

Dust Minimisation

C13. The Applicant shall carry out all responsible and feasible measures to minimise dust generated by the Site.

C14. During construction and operation of the Development, the Applicant shall ensure:

a) all vehicles on Site do not exceed the designated on Site speed limit;

b) all loaded vehicles entering or leaving the Site have their loads covered; and

c) all vehicles leaving the Site are cleaned of dirt, sand and other materials before they leave the Site, to avoid tracking these materials on to public roads.

Vapour Recovery Unit

C15. The Applicant shall install and commission a vapour recovery unit on the six bay truck loading gantry prior to:

a) annual throughput of petroleum products exceeding 1,300 ML; or

b) bulk storage of any Class 3 Flammable Liquid Dangerous Goods, described in the EIS.

C16. The vapour recovery unit shall be designed, constructed and operated in accordance with the requirements of the EPL.

C17. The Applicant shall monitor emissions from the vapour recovery unit stack in accordance with the requirements of the EPL. The monitoring data shall be reported to the PIN on a quarterly basis, or in accordance with the monitoring frequency required in the EPL.

C18. If the results of monitoring show any impact greater than that predicted by the air quality modelling in the EIS, the Applicant shall investigate and implement further air quality mitigation measures as directed by the Secretary or the EPA.

Air Quality Management Plan

C19. The Applicant shall update the existing Air Quality Management Plan for the Site to include the Development, to the satisfaction of the Secretary. This plan shall:

a) be approved by the Secretary prior to operation of the Development;

b) describe the measures that would be implemented to ensure compliance with the relevant conditions of this consent and the EPL;

c) describe the air quality monitoring to measure the performance of the Development against the conditions of this consent and the EPL; and

d) demonstrate the air quality measures for the Development are consistent with the PONs Mayfield Air Quality Monitoring Plan, October 2016, or its latest version.

Greenhouse Gas

C20. The Applicant shall implement all reasonable and feasible measures to minimise energy use on Site and greenhouse gas emissions produced on Site.

Meteorological Monitoring

C21. The Applicant shall install, operate and maintain a meteorological weather station on the Site that complies with the requirements of an EPL for the site.

3.5 Environmental Protection Licence

The NSW EPA issues EPLs to the owners or operators of various industrial premises under the POEO Act 1997. Licence conditions relate to pollution prevention and monitoring, cleaner production through recycling and reuse, and the implementation of best practice.

The site is licensed under EPL number 20193 as a scheduled activity relating to chemical storage and shipping in bulk. The sections of the licence that relate to air quality items are listed in **Table 3**.

Table 3 EPL 20193 Air Quality Related Items

EPL Section	Description
P1.3	Requirement for weather monitoring required in site, identified as EPL point 6.
L2.2	Loads limits set for Benzene (423 kg / year) and VOCs (21,469 kg / year).
L7.2	The licensee must not cause or permit the emission of offensive odour beyond the boundary of the premises.
L8.1	The stack used to vent emissions from truck filling activities must be a minimum of 15 metres in height.
L8.2	The exit velocity of emissions from the stack used to vent emissions from truck filling activities must exceed 15 metres per second at all times.
O3.1	The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.
O3.2	All operations and activities occurring at the premises must be carried out in a manner that will minimise the emission of dust from the premises.
O3.3	Trucks entering and leaving the premises that are carrying loads of dust generating materials must have their loads covered at all times, except during loading and unloading.
M5.1	Weather monitoring requirements, summarised below: • Temperature at 2 m; • Temperature at 10 m; • Wind direction at 10 m; • Wind speed at 10 m; • Sigma theta; • Total Solar Radiation; • Rainfall at 10 m; • Siting to AM-2 & AM-4; and • Measurement to AM-2 & AM-4.
E1.1	A Vapour Recovery Unit (VRU) must be installed and commissioned at the premises prior to the bulk storage of any Class 3, Flammable Liquid Dangerous Goods (excluding from the generation of Slops).
E1.2	The Vapour Recovery Unit (VRU) must be designed, constructed, commissioned, operated and maintained at the premises to reduce the emission of volatile organic compounds (VOCs), including benzene, to the atmosphere from vehicle loading operations in respect of the Vehicle Fill Gantries (VFG). The VRU must include the following control equipment: (a) A vapour collection system by which all vapour displaced from tanks during bulk road vehicle loading operations is collected and conveyed to a vapour recovery system through vapour lines having an internal diameter of not less than 65 percent of the largest fill-line used for connection to the delivery tank. (b) An interlock system that prevents the loading of a delivery tank unless:

EPL Section	Description
	(i) the vapour collection system is first connected to that tank; or (ii) the interlock system forms part of industrial plant used only for loading delivery tanks that are themselves fitted with such an interlock system. (c) Fittings on all liquid and vapour lines that make vapour-tight connections with the respective mating fittings on the delivery tank and that close automatically when disconnected. (d) The vapour recovery system is constructed so that the vapour resulting from loading operations is recovered, so that the concentration of unrecovered vapour emitted to the atmosphere during any period of four hours does not exceed 10 milligrams per litre of volatile organic liquid passing out of the plant during that period.
E1.3	The licensee must provide written notification to the EPA within seven days of commissioning the VRU. Notification must be provided to the EPA's Director - Hunter at PO Box 488G, Newcastle NSW 2300, or by email to hunter.region@epa.nsw.gov.au.

4.0 Existing Environment

4.1 Air Quality

The primary pollutants of interest in the Newcastle airshed are particulate matter and photochemical smog/ozone and its precursors (oxides of nitrogen and VOCs)[1]. Significant industrial pollutant sources include the nearby Orica, Aluminium smelting. Other fuel storage facilities in Newcastle include Caltex (Wickham) and BP (Carrington) and Park Fuels *(Kooragang Island).

The pollutants of prime interest in NSW are ozone and particulates, with levels of these pollutants approaching or exceeding the national standards prescribed in the National Environment Protection Measure for Ambient Air Quality (NEPM) on occasion. Pollutant levels in Newcastle, however, are generally acceptable, with limited exceedances noted The Stolthaven facility is not expected to generate significant levels of ozone or particulates.

No local monitoring of VOCs was identified at the time of preparation of this report. The NSW EPA Approved Methods (DEC 2005), however, does not require the cumulative assessment of VOC impacts (i.e. consideration of background VOC levels is not required).

4.2 Regional Meteorology

The Bureau of Meteorology (BoM) records long-term meteorological data at a number of automatic weather stations around the country (NSW EPA monitoring stations are generally only short-term and do not show long-term data and statistics). The BoM station that best represents the region is located at Williamtown, approximately 13 km northeast of the Site. Selected long-term regional meteorological data were obtained from the BoM Williamtown monitoring station; a summary is provided in the following sections. Average climate parameters recorded at this station are shown in **Appendix A**.

4.2.1 Climate

The warmest temperatures occur between November and March, with the warmest average maximum temperatures occurring in January (28.0ºC). The coldest temperatures are recorded in the winter months, with the lowest average minimum temperature occurring in July (6.4ºC).

The highest average rainfall is recorded in June (121.9mm), while September is the driest month (59.3 mm). Humidity in the area is relatively high, with recorded levels typically between 50 and 80%. Wind speeds are typically higher at 3 pm compared to 9 am.

4.2.2 Wind Direction

The long-term wind rose diagrams for the Williamtown monitoring station are shown in **Appendix A**. The wind roses show the frequency of occurrence of winds by direction and strength. The bar at the top of each wind rose diagram represents winds blowing from the north (i.e. northerly winds), and so on. The length of the bar represents the frequency of occurrence of winds from that direction, and the widths of the bar sections correspond to wind speed categories, the narrowest representing the lightest winds. Winds recorded at Williamtown at 9 am blow predominantly from the west. In the afternoons, recorded winds blow predominantly from the east and southeast.

[1] City of Newcastle. (2009). 2008/09 State of the Environment Report – The City of Newcastle.

5.0 Potential Emissions

5.1 Pollutants

The pollutants of potential concern for the site are generally related to fugitive emissions from fuel storage tanks and from the fuel loading gantry stack. The pollutants expected from these operations are described below.

5.1.1 Volatile Organic Compounds

The main emissions of interest for fuel storage activities are volatile organic compounds (VOCs). VOCs are organic compounds with a vapour pressure exceeding 0.13 kPa at a temperature of 20°C. VOCs have been implicated as a major precursor in the production of photochemical smog, which causes atmospheric haze, eye irritation and respiratory problems. VOCs can be emitted from storage tanks, filling stations vents, pipelines and process equipment leaks at plant associated with fuel storage.

The EPA does not have a criterion for collective VOCs, rather provides impact assessment criteria for a number of individual VOC species. The EPA specified that cumene was the most critical substance to be assessed for diesel vapour in the assessment of the approved facility[2]. Cumene (also known as 1-methylethylbenzene and isopropylbenzene) is a colourless, volatile liquid at room temperature. Cumene readily volatilises into the atmosphere from water and dry soil. The chemical is rapidly metabolised and excreted[3].

Cumene is a component of high octane fuels and crude oil. Cumene has a short life expectancy in the atmosphere, so emissions are expected to be confined to the local area of emission. It evaporates when exposed to air, and is broken down by bacteria in soil and water [4,5].

Cumene can enter the body through inhalation, ingestion or dermal contact. The chemical has a depressant effect on the central nervous system, and short-term exposure can cause narcotic-like effects such as dizziness, drowsiness and unconsciousness, as well as headaches and irritation of the eyes, nose and throat [4,5]. Cumene is considered to be moderately acutely toxic to aquatic life and highly toxic to birds[5]. No information is available on the carcinogenic effects of cumene in humans or animals. The US EPA has classified cumene as not classifiable as to human carcinogenicity[4].

Additional VOCs typical of benzene emissions have also been identified in approved air quality assessments of the Facility[6] and include benzene, trimethylbenzene, toluene, ethylbenzene and xylenes.

5.1.2 Odour

Odour emissions from fuels are typically associated with aromatic hydrocarbons, of which VOCs are a subclass. The level of odour emission is dependent upon the vapour pressure of the substances; compounds with higher vapour pressures emit higher levels of odour. As diesel and biodiesel fuel have low vapour pressures, odour emissions from the storage of these substances are expected to be minimal.

Furthermore, sensitive receptors are located at a distance of 400 m or greater from the site. This distance is expected to be sufficient to mitigate potential adverse odour impacts.

[2] AECOM. (2012). Air Quality Impact Assessment – Proposed Bulk Liquid Fuel Storage Facility.
[3] WHO. (1999). Concise International Chemical Assessment Document 18 – Cumene. World Health Organization: Geneva.
[4] US EPA. Technology Transfer Network Air Toxics Website; http://www.epa.gov/ttn/atw/hlthef/cumene.html; accessed 1 February 2012
[5] NPI. http://www.npi.gov.au/substances/cumene/index.html.; accessed 1 February 2012.
[6] AECOM (2015) AECOM. (2012). Air Quality Impact Assessment – Stolthaven Mayfield Fuel Terminal - SSD_6664 MOD1 - Throughput Increase to 1,300MLBulk Liquid Storage Terminal, Mayfield NSW.

5.2 Previous Air Dispersion Modelling

5.2.1 SSD_6664 (approval surrendered)

Various air quality impact assessments have been prepared by AECOM as part of the development application process. The latest air assessment[8], as part of development application SSD 6664 (prior to modification No. 1), considered impacts associated with operations from the facility with annual throughput of 1,010 ML of a combination of diesel and biodiesel. VOC emissions associated with diesel and biodiesel storage from operation of the Facility were estimated through dispersion modelling using the CALPUFF model in accordance with the NSW EPA's Approved Methods (DEC 2005). The assessment was also undertaken in accordance with the Port of Newcastle's Mayfield Concept Plan Site Air Quality Model.

The impact assessment concluded that the sites operational emissions at a throughput of 1,010ML resulted in compliance with the NSW EPA criteria at all sensitive receptor locations assessed, including boundary receptors where appropriate.

5.2.2 SSD_6664 Modification No. 1 (approval surrendered)

Following the approval of SSD_6664 Stolthaven required additional throughput to meet operational requirements driven by customer demand. Stolthaven therefore sought to modify (Mod 1) the existing approval to increase the approval annul throughput from 1,010ML to 1,300ML. As part of the environmental assessment undertaken for Mod 1, a revised Air Quality Impact Assessment was prepared to examine the potential impact of an annual throughout of 1,300ML. This assessment was undertaken in accordance with the NSW EPAs Approved Methods (DEC, 2005) and utilised the same methodology as the previous assessment however modelled the additional tanks and truck headspace displacement that would occur as a result of the increased throughput.

The impact assessment concluded that the sites operational emissions at a throughput of 1,300ML resulted in compliance with the NSW EPA criteria at all sensitive receptor locations assessed, including boundary receptors where appropriate.

5.2.3 SSD_7065

The latest air assessment as part of the development application SSD 7065 considered impacts associated with operations of 17 additional fuels storage tanks for the storage of petroleum, diesel, ethanol and jet fuel, the installation and operation of a VCS/VRU for the gantry emission and impacts associated with the increase in annual throughput from 1,300ML to 3,500ML. This assessment investigated the air quality impacts of the Project on the surrounding environment and took into consideration potential cumulative impacts of the existing and proposed terminal elements. The assessment was undertaken in accordance with the NSW EPAs Approved Methods (DEC, 2005) and utilised the same methodology as the previous assessment however modelled the additional tanks and truck headspace displacement that would occur as a result of the increased throughput.

The impact assessment concluded that the sites operational emission at a throughput increase to 3,500ML p.a. resulted in compliance with the NSW EPA criteria and is not expected to adversely affect the environment or amenity of receptors.

In October 2022, Stolthaven further engaged GHD to perform an Air Quality Impact Assessment to review the current operations/site infrastructure with a proposed maximum annual throughput of 1,800ML per annum. This study was undertaken to ascertain environmental impacts from potential higher demand of combustible fuel only, from the current development. The assessment was undertaken in accordance NSW EPA Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales 2022 (the Approved Methods) which lists the statutory methods for modelling and assessing emissions of air pollutants from stationary sources in NSW.

This impact assessment concluded that the sites operational emission at a throughput increase to 1,800ML p.a. of combustible product resulted in compliance with the relevant air quality criteria.

6.0 Mitigation Measures and Monitoring

The measures set out in the following sections have been designed to limit the amount of potential pollution and greenhouse gases released from the site.

6.1 Operational Mitigation Measures

Operational mitigation measures focus on the undertaking of specific activities in a manner designed to minimise environmental impacts. Emissions can generally be well managed through best practice management and mitigation strategies. A hierarchy of emission control is recommended as best practice, which consists of:

- Prevention;
- Suppression; and
- Containment.

As such, prevention of emissions is the primary goal of management actions. The following actions are recommended at the site:

- All vehicles and plant/equipment should be fitted with appropriate emission control equipment and be serviced and maintained in accordance with the manufacturers' specifications. Smoke from vehicles/plant should not be visible for more than ten seconds;
- Trucks entering and leaving the premises that are carrying loads of dust-generating materials must have their loads covered at all times, except during loading and unloading (as per EPL condition O3.3);
- Hard surfaces or paving should be used where possible, as unpaved routes can account for a significant proportion of fugitive dust emissions, particularly during dry/windy conditions. Routes should be inspected regularly and repaired when necessary, and roads should be swept and watered as required to limit dirt/dust build up and potential dust generation during windy conditions;
- Any areas on site that are not covered with hard surfaces should be vegetated wherever possible to minimise wind erosion and associated dust generation; and
- All vehicles should be switched off when not in use for extended periods.

Potential greenhouse gas emissions will also be minimised by the above measures, specifically the proper maintenance of equipment and vehicles to ensure efficient combustion of fuel products and switching off vehicles when not in use.

6.2 Environmental Management Strategy

In accordance with the Project Approval requirements for the existing Facility, Stolthaven has in operation an Environmental Management Strategy (EMS) which includes a range of management plans for the control of various operational systems and environmental aspects. This suite of documents includes:

- Health, Safety and Environmental Management (EMS);
- Safety, health, environment and quality polices;
- Accident and incident reporting system; and
- Operational Environmental Management Plan (OEMP), incorporating the following sub plans:
  - Soils, contamination and acid sulphate soils;
  - Surface water;
  - Groundwater;
  - Noise and vibrations;

- Air quality;
- Traffic; and
- Dangerous goods.

The EMS was prepared in consultation with key agency stakeholders including the NSW EPA, Hunter development corporation (HCCDC), City of Newcastle (CON) and PON with evidence of consultation provided to DPE.

- All vehicles and plant/equipment should be serviced and maintained in accordance with the manufacturers' specifications. Smoke from vehicles/plant should not be visible for more than ten seconds;
- Trucks entering and leaving the premises that are carrying loads of dust-generating materials must have their loads covered at all times, except during loading and unloading (as per EPL condition O3.3);
- Hard surfaces or paving should be used where possible, as unpaved routes can account for a significant proportion of fugitive dust emissions, particularly during dry/windy conditions. Routes should be inspected regularly and repaired when necessary, and roads should be swept and watered as required to limit dirt/dust build up and potential dust generation during windy conditions;
- Any areas on site that are not covered with hard surfaces should be vegetated wherever possible to minimise wind erosion and associated dust generation; and
- All vehicles should be switched off when not in use.

Potential greenhouse gas emissions will also be minimised by the above measures, specifically the proper maintenance of equipment and vehicles to ensure efficient combustion of fuel products and switching off vehicles when not in use.

Emissions from the truck filling stations will be vented from a stack to ensure that appropriate dispersion of emissions is achieved in accordance with the project air quality modelling.

6.3 Monitoring

6.3.1 Ambient Monitoring

The mitigation measures described in the previous section were designed to result in acceptable impacts from the site's operations. As the site's operations are expected to result in acceptable air quality impacts, air monitoring specifically for the site's operations is not considered necessary. Stolthaven will, however, consult with PON regarding the development and implementation of the Mayfield Concept plan monitoring program.

The PON Mayfield Concept Plan consent conditions, application number 09_0096, state that monitoring should be considered for projects within the Concept Plan area. The text from section 2.13 of the consent condition is below.

"The Proponent shall develop and implement an Air Quality Monitoring Program, to outline how the air quality impacts, and in particular particulate matter impacts, of the projects associated with this Concept Plan approval will be monitored and proactively managed."

The weather monitoring requirements in EPL 20193 section M5.1 are met by utilising data from the nearby Mayfield berth 4 monitoring station located within the PON Concept Plan area. The station meets NSW EPA monitoring guidelines AM-2 & AM-4 in accordance with the EPL condition.

6.3.2 Vapour Recovery Unit Conditions

The site's consent conditions (SSD 7065) state that *C17. The Applicant shall monitor emissions from the vapour recovery unit stack in accordance with the requirements of the EPL. The monitoring data shall be reported to the PON on a quarterly basis, or in accordance with the monitoring frequency required in the EPL.*

Stolthaven have committed to installing a VCS at the Mayfield Terminal, such that vapours generated by loading petrol, diesel, jet fuel and ethanol into road tankers at the tanker truck gantry will be captured and processed before release to atmosphere. These vapours, which may contain VOC's will be collected by a common vapour header system at each loading bay in the gantry and directed to a carbon adsorption Vapour Recovery Unit (VRU). The VRU is designed to recover >98% of the hydrocarbon content of the waste vapour stream generated by loading road tankers. The VCS/VRU meets the requirements of the POEO (Clean Air) clause 64 (2) (d) (ii) for control equipment fitted to large loading plant in the Sydney Metropolitan area, as transcribed below:

> *(d) The vapour recovery or disposal system constructed so that the vapour resulting from loading operations is recovered, so that the total concentrations of unrecovered vapour emitted to the atmosphere during any period of 4 hours does not exceed 10 milligrams per litre of volatile organic liquid passing out of the plant during that period.*

7.0 Reporting, Complaints and Responsibilities

7.1 Complaint / Event Reporting

If complaints are received or a pollution incident at the site occurs (which may include spillage of fuel products or failure of mitigation equipment), the Site Manager (or similar position) will complete an Environmental Incident Report Form (EcoPortal) to record details of the occurrence and actions taken. Where applicable, completed forms should detail the following:

- The indicators of the incident (visible, reported), and include the pollutant type, date, time, duration, and location;
- The activities operating that could have or are known to have contributed to the incident;
- Weather conditions during the incident;
- A summary of any reviews of the operating procedures; and
- Recommendations for mitigating the source of the incident where applicable. This may involve a short term response and/or a long term management plan.

7.2 Responsibilities and Accountabilities

Details of roles, responsibility, authority and accountability of key site personnel are detailed in **Table 4**.

Table 4 Key Site Personnel

Role	Responsibility	Authority	Accountability
Site Manager	Ensure all site mitigation measures are undertaken in accordance with this Management Plan.	Provide advice to the Operations Manager.	Reports to the Operations Manager.
	Provide reports in accordance with **Section 7.1**.	Advise of events and complaints.	Reports to the Operations Manager.
	Manage complaints and pollution incidents.	Follow contingency plan in accordance with **Section 8.0**.	Reports to the Operations Manager.
Operations Manager	Oversight of implementation of mitigation measures. In conjunction with the Site Manager, develop mitigation and community engagement initiatives.	Involvement in community engagement and impact mitigation strategies.	Reports to senior management.
	Compliance with the requirements of the Mayfield Concept Plan Air Quality Monitoring Program	Undertake reporting and tasks as per the requirements of the Mayfield Concept Plan Air Quality Monitoring Program.	Reports to senior management and PON.

7.3 Reporting

Reporting to PON would be undertaken in accordance with the requirements of the Mayfield Concept Plan Air Quality. Refer to Section 2.5 of that plan.

8.0 Emergency Response and Contingency Plan

The site holds an Emergency Response & Pollution Incident Response Management Plan to respond to an uncontrolled emission to air, land or water that threatens human health or the environment. This emergency response allows for communication to all staff and in community meetings where appropriate. In the event of such an uncontrolled emission, the following actions should be conducted in the order stated:

1. Immediate mitigation controls should be implemented for an ongoing emission where they can be implemented safely;
2. In the case of a plume containing a potentially hazardous atmosphere moving off-site, emergency services should be contacted to evacuate the area downwind of the emission. Emergency services are to be informed of the nature of the emission so as to be able to wear correct protective equipment (i.e. full face masks and aided breathing apparatuses);
3. In the case of a spill of fuel, emergency services should be contacted to assist in spill containment and clean up procedures. Emergency services should be informed of the nature of the spill on notification; and
4. Following an emergency response, an investigation into the cause of the uncontrolled emission is to be conducted. Results of the investigation should be used to implement procedures and checks to prevent future occurrences.

8.1 Contingency Plan

In the event that complaints are received or a pollution incident at the site is registered, the Site Manager will take action to assess the causes, consult with and discuss required remediation measures with affected parties, and implement/upgrade mitigation measures to reduce the chance of the event recurring.

Corrective actions should be taken as a tailored response to an event in consideration of the severity and implications of the specific event. As a general guide, corrective actions may be undertaken according to the following brief procedure. Reporting requirements detailed in **Section 7.1** should also be completed.

Table 5 Contingency Plan Actions

Order	Action
1	Ensure that the immediate safety of potentially affected parties is not continuing to be affected by the event.
2	Review the indicators of the incident against activities at the site and weather conditions to confirm that the site contributed to the incident.
3	Review operating procedures for opportunities to reduce the risk of the incident recurring.
4	Depending on the source of the incident, it may be appropriate to augment the existing measures.
5	Investigate the appropriateness of upgrading plant and equipment.
6	Consider discontinuing the contributing activity until it may be done acceptably.

Should the complaints or pollution events require further quantification, ambient air monitoring may be required. Details of proposed monitoring equipment and the justification for the proposed monitoring locations should be assessed. The monitored data should be measured against the relevant NSW EPA or NEPM standards. Reviewing the data, however, should also take into account external factors including weather conditions (such as dust storms, wind direction) and other pollution sources in the local area.

9.0 Data Storage and Plan Review

A consistent and concise data storage and collection procedure has been implemented for the collection of all complaints, contingency plans, investigations and any other reporting related to an air quality incident/event.

This AQMP should be reviewed in conjunction with the review schedule of related environmental management plans. Additional review of this Plan should be conducted following any change in statutory requirements, operational or management procedures or following any serious or repeated failure to meet criteria levels. This Plan should also be reviewed following a review of the Mayfield Concept Plan Air Quality Monitoring Program to ensure consistency between the two documents.

Appendix A

Meteorological Summary

Appendix A Meteorological Summary

Table 6 Long Term Climate Averages, BOM Williamtown (1942-2010)

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Temperature													
Mean maximum temperature (°C)	28.0	27.6	26.2	23.7	20.3	17.7	17.0	18.6	21.3	23.6	25.5	27.2	23.1
Mean minimum temperature (°C)	18.0	18.1	16.3	13.2	10.0	7.9	6.4	6.8	9.1	11.9	14.4	16.5	12.4
Rainfall													
Mean rainfall (mm)	96.6	121.4	120.2	107.5	112.9	121.9	73.8	74.2	59.3	73.4	84.1	78.7	1122.9
Mean number of days of rain ≥ 1 mm	7.1	7.4	8.1	7.4	7.9	8.2	6.4	6.1	5.5	7.3	7.4	7.0	85.8
9 am Conditions													
Mean 9am temperature (°C)	23.0	22.5	21.2	18.2	14.3	11.6	10.5	12.2	15.7	18.8	20.5	22.2	17.6
Mean 9am relative humidity (%)	72	76	77	76	79	80	77	71	66	64	66	68	73
Mean 9am wind speed (km/h)	11.9	10.6	10.2	11.4	13.7	15.9	16.4	16.8	15.3	14.4	14.4	12.9	13.7
3 pm Conditions													
Mean 3pm temperature (°C)	26.5	26.1	24.9	22.5	19.3	16.8	16.2	17.6	20	21.9	23.8	25.6	21.8
Mean 3pm relative humidity (%)	59	62	61	59	60	60	55	50	50	54	55	56	57
Mean 3pm wind speed (km/h)	21.9	20.6	18.9	17.2	15.8	17.5	18.7	20.9	22	22.5	23.5	23.5	20.2

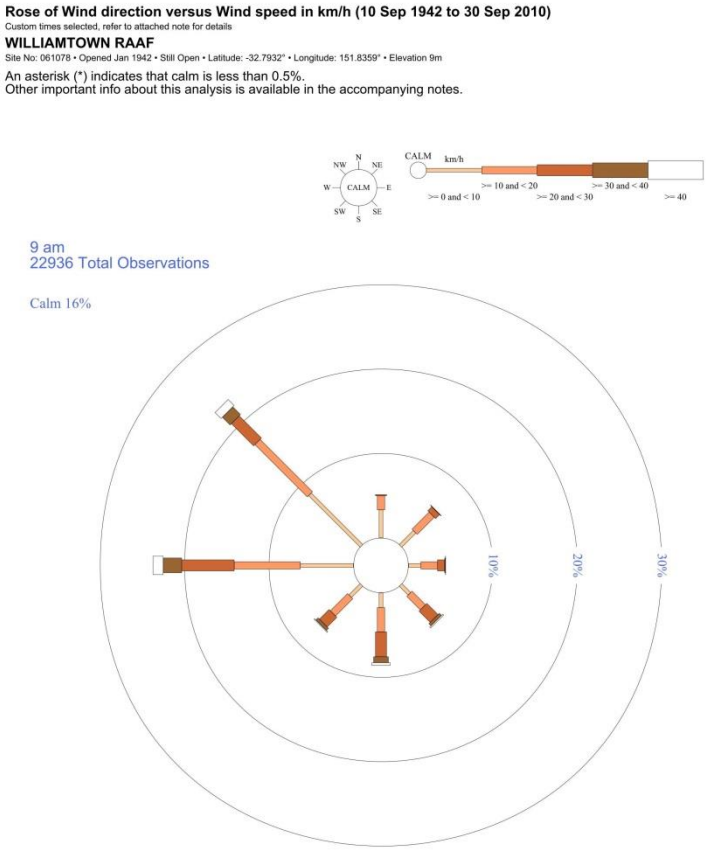

Figure 2 Williamtown Airport 9am Wind Rose (Aug 1942 to Sep 2010)

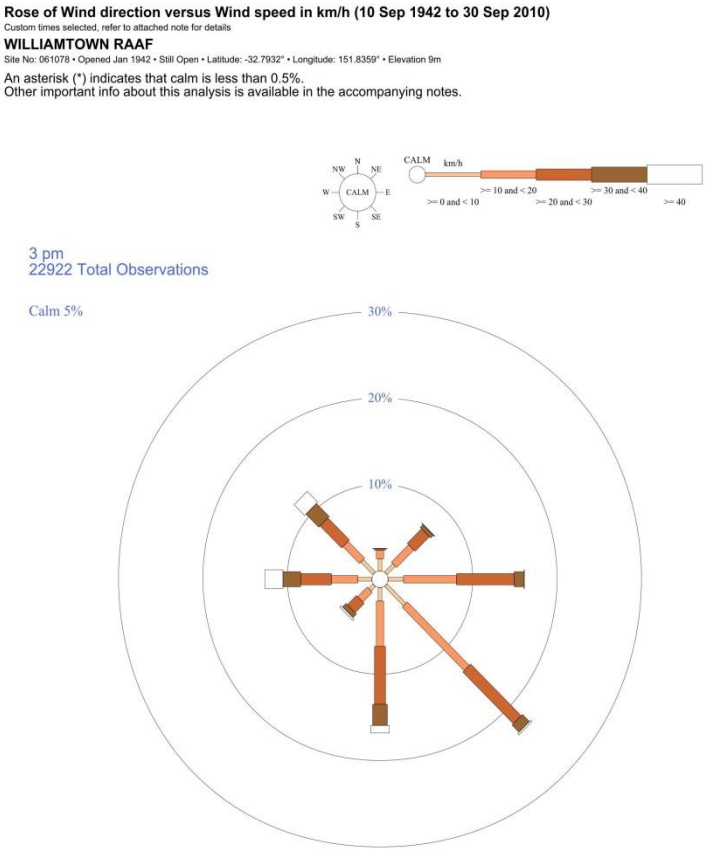

Figure 3 Williamtown Airport 3pm Wind Rose (Aug 1942 to Sep 2010)

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